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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/674,604	09/30/2003	Jimmie Earl DeWitt JR.	AUS920030478US1	4478

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EXAMINER
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FIEGLE, RYAN PAUL

ART UNIT	PAPER NUMBER
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2183

DATE MAILED: 01/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/674,604	DEWITT ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Ryan P. Fiegler	2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 9/30/03, 7/1/05
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because of the following informalities: Please revise pages 1 and 2 of the specification to include the serial numbers of the related applications as they are now assigned. Appropriate correction is required.

### ***Claim Objections***

1. Claim 3 is objected to because of the following informalities: The phrase, "an event includes at least one of..." is repeated twice. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 6, 12-17, 22, 23 and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
4. Claim 6 refers to "an instruction cache" on line 6 of the claim when "an instruction cache" is already referred to in lines 2 and 3 of the same claim. It is unclear whether the second instance of "an instruction cache" refers to the same instance of the instruction cache or another instruction cache.
5. Claim 12 recites the limitation "the instruction" in line 7. There is insufficient antecedent basis for this limitation in the claim.

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6. Claim 22 recites the limitation "the instruction" in line 8. There is insufficient antecedent basis for this limitation in the claim.

7. Claim 23 recites the limitation "the memory location" in line 3. There is insufficient antecedent basis for this limitation in the claim.

8. Claim 25 recites the limitation "the access to the memory location" in line 3. There is insufficient antecedent basis for this limitation in the claim.

9. Any claims not referred to specifically are rejected based on the deficiencies inherited by the dependencies.

### ***Double Patenting***

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1, 19 and 24 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 13 and 21 of copending Application No. 10/675776 (hereon referred to as the 776 application). This is a provisional obviousness-type double patenting rejection.

As per claim 1, steps explicitly recited in the first limitation of the instant application are inherent in the 776 application. For instance, it is inherent that an instruction will be received to do the determining since determining cannot be done without the presence of an instruction. It is also inherent that the determining is done by a processor.

In the second limitation, "incrementing a counter associated with the instruction in response to detecting execution," found in the 776 application is a species of the genus found in the instant application stating, "counting events associated with execution of the instruction."

The scope of the phrase, "a determination that the instruction is associated with the indicator," in the 776 application is the same as the phrase, "if the indicator is associated with the instruction."

Further, the only missing aspect from the 776 application is counting events for subsequent instructions. This would be an obvious step. For instance, Pardo et al. (US Patent 5,754,839) associates counters with several watchpoints and instructions (column 2, lines 7-39). One skilled in the pertinent art would have recognized that having a counter for counting events associated with only one instruction watchpoint

would not be very useful and that counting events for subsequent instructions would be an obvious step.

Similar arguments apply to claims 19 and 24 in reference to claims 13 and 21 of the 776 application.

12. Claims 1, 18, 19 and 24 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 11, 18 and 23 of copending Application No. 10/675777. This is a provisional obviousness-type double patenting rejection.

The only missing aspect from the referenced application is counting events for subsequent instructions. This would be an obvious step. For instance, Pardo et al. (US Patent 5,754,839) associates counters with several watchpoints and instructions (column 2, lines 7-39). One skilled in the pertinent art would have recognized that having a counter for counting events associated with only one instruction watchpoint would not be very useful and that counting events for subsequent instructions would be an obvious step.

13. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

14. Claims 7, 8, 12 and 22 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 5, 6, 10 and 18 of copending Application No. 10/675776. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

15. Claims 3, 6, 7, 9, 10, 12, 17 and 22 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 5, 6, 8, 9, 10, 15, 17 and 22 of copending Application No. 10/675777. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

***Claim Rejections - 35 USC § 101***

16. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 24 and 25 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 24 and 25 claim a computer program product in a computer readable medium which the specification defines as including, "transmission-type media, such as digital and analog communications links, wired or wireless communications links using transmission forms, such as, for example, radio frequency and light wave transmissions," which have been found to be non-statutory.

***Claim Rejections - 35 USC § 102***

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17. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

18. Claims 1-5, 8, 9, 11, 19-21 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Pardo et al. (US Patent 5,754,839).

19. As per claim 1:

A method in a data processing system for processing instructions, the method comprising:

responsive to receiving an instruction at a processor in the data processing system, determining whether an indicator is associated with the instruction (column 2, lines 7-13); and

counting events associated with execution of the instruction and subsequent instructions if the indicator is associated with the instruction (column 2, lines 33-37).

20. As per claim 2:

The method of claim 1, wherein the counting step comprises:

sending a signal to a performance monitor unit in the processor in response to determining that the indicator is associated with the instruction (column 4, lines 52-59; column 5, lines 38-49); and

counting the events associated with execution of the instruction and subsequent instructions using the performance monitor unit (column 6, lines 6-13).

21. As per claim 3:



The method of claim 1, wherein an event includes at least one of an entry into a module, an exit from a module, an entry into a subroutine, an exit from a subroutine, an entry into a function, starting of input/output, completion of input/output, execution of the instruction, and time needed to execute the instruction (column 5, lines 11-14; column 6, lines 2-6) (Instructions that are associated with watchpoints are executed. This fulfills the limitations of "execution of the instruction," and "time needed to execute the instruction," since it is inherent that the processor will be provided time to execute the instruction properly. Since the claim is written so that an event includes "at least one of..." the limitations are in the alternative and only one needs to be met to fulfill the limitations of the claim.).

22. As per claim 4:

The method of claim 1 further comprising:

receiving another instruction after receipt of the instruction, wherein the another instruction is associated with the indicator (column 7, lines 66-67; column 8, lines 1-2);  
and

halting counting of the events associated with the execution of the instruction and subsequent instructions in response to receiving the another instruction associated with the indicator (column 8, lines 2-11) (A breakpoint will halt counting).

23. As per claim 5:

The method of claim 1, wherein the indicator is a first type of indicator and further comprising:

receiving another instruction after receipt of the instruction, wherein the another instruction is associated with a second type of indicator (column 7, lines 66-67; column 8, lines 1-11) (When the instruction associated with the watchpoint triggers a breakpoint, the breakpoint is also associated with the instruction.); and

halting counting of the events associated with the execution of the instruction and subsequent instructions in response to receiving the another instruction associated with the second type of indicator (column 8, lines 2-11).

24. As per claim 8:

The method of claim 1, wherein the indicator associated with the instruction is located in a shadow memory (column 6, lines 2-6) (A history buffer is a shadow memory since it holds state information for architectural locations.).

25. As per claim 9:

The method of claim 1, wherein the instruction is received in a bundle and wherein the indicator comprises at least one spare bit in the bundle (column 5, lines 51-66).

26. As per claim 11:

The method of claim 1, wherein an event in the events includes at least one of an entry into a module, an exit from a module, an entry into a subroutine, an exit from a subroutine, an entry into a function, starting of input/output, completion of input/output, and the execution of the instruction (column 5, lines 11-14; column 6, lines 2-6) (Instructions that are associated with watchpoints are executed. This fulfills the limitations of "execution of the instruction." Since the claim is written so that an event

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includes "at least one of..." the limitations are in the alternative and only one needs to be met to fulfill the limitations of the claim.).

27. As per claims 19-21:

Claims 19-21 recite the system for performing the method of claims 1-3. Pardo et al. disclose a system to perform their method (Figure 2). Therefore, claims 19-21 are rejected for the same reasons as claims 1-3.

28. As per claim 24:

While Pardo et al. do not explicitly disclose a computer program product in a computer readable medium for the execution of his method (column 2, lines 7-37), such is inherently present since it would be impossible to execute the method unless it was embodied on some form of computer readable medium. Therefore, claim 24 is rejected for the same reasons as claim 1.

### ***Claim Rejections - 35 USC § 103***

29. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

30. Claims 12-14, 16, 17, 22, 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pardo et al. (US Patent 5,754,839) in view of Edwards et al. (US Patent 6,378,064).

31. As per claim 12:

Pardo et al. teach counting events associated with instructions (Pardo et al.: column 2, lines 7-13).

Pardo et al. does not teach counting events associated with data accesses.

Edwards et al. teach a method in a data processing system for monitoring access to data, the method comprising:

responsive to receiving data at a processor in the data processing system, determining whether an indicator is associated with the data (Edwards et al.: column 16, lines 33-37).

Edwards et al. comment that setting watchpoints for instructions can be difficult to implement; therefore, setting watchpoints for data accesses can be desirable (Edwards et al.: column 1, lines 26-33).

Therefore, it would have been obvious to one of ordinary skill in the pertinent art at the time of the applicant's invention that applying Edwards et al. to Pardo et al. would alleviate the difficulties associated with setting watchpoints solely based on instructions.

32. As per claim 13:

The method of claim 12 further comprising: halting counting of events associated with accesses to the data when the indicator is associated with the data is encountered a second time (Pardo et al.: column 7, lines 66-67; column 8, lines 1-11) (The watchpoint counters can be set to watch for two events before a breakpoint occurs, halting the counting.).

33. As per claim 14:

The method of claim 12 further comprising: halting counting of events associated with accesses to the data when a different indicator associated with the data is encountered (Pardo et al.: column 7, lines 66-67; column 8, lines 1-11) (When the instruction associated with the watchpoint triggers a breakpoint, the breakpoint is also associated with the instruction in Pardo. This would remain true when Edwards et al. is applied to Pardo et al. and the watchpoints are used for data as well.).

34. As per claim 16:

The method of claim 12, wherein the data is in one of a memory location or a range of memory locations (Though it is not disclosed explicitly in Edwards et al., it is inherent that a range of addresses will be associated with a watchpoint in certain instances. For example, for floating point instructions that use floating-point 64-bit operands, the watchpoint will cover the range of two addresses.).

35. As per claim 17:

The method of claim 12, wherein an event in the events includes at least one of the access to the memory location (Edwards et al.: column 16, lines 33-37).

36. As per claim 22:

Claim 22 is the system for performing the method of claim 12. Pardo et al. and Edwards et al. disclose systems for performing their methods (Pardo et al.: Figure 2) (Edwards et al.: Figure 13). When the two references are combined, this would remain true. Therefore, claim 22 is rejected for the same reasons as claim 12.

37. As per claim 23:

Claim 23 is the system for performing the method of claim 17. Pardo et al. and Edwards et al. disclose systems for performing their methods (Pardo et al.: Figure 2) (Edwards et al.: Figure 13). When the two references are combined, this would remain true. Therefore, claim 23 is rejected for the same reasons as claim 17.

38. As per claim 25:

While Pardo et al. can teach a computer program product in a computer readable medium as claimed in 24 as discussed above, Pardo can not teach the limitations of claim 25 because Pardo does not teach watchpoints associated with data accesses. However, as was shown above, there is motivation to apply Edwards et al. to Pardo et al. to modify Pardo's method to include memory accesses. It would have been obvious to one of ordinary skill in the pertinent art at the time of the applicant's invention that when modifying Pardo's method to include memory accesses, that this would also include modifying the computer program product containing instructions to execute the method.

39. Claims 6 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pardo et al. (US Patent 5,754,839) as applied to claim 1 and in view of Betker et al. (USPGPub 2003/0154463).

40. Pardo et al. teach claim 1 for the reason listed above.

41. As per claim 6:

Pardo et al. do not teach receiving their watchpoints from an instruction cache. Instead, the watchpoints are generated from the I-bus support logic (Pardo et al.: Figure 2, item 10) based on user-programmed rules using comparators. Using the signals

from the I-bus support logic, the performance monitor counts events based on watchpoints associated with execution of an instruction and subsequent instructions.

Betker et al. teach sending a signal to a performance monitor unit from an instruction cache (Betker et al.: Abstract).

Betker et al. comment that keeping the indicators in the instruction cache and transmitting them to the performance monitor unit from the instruction cache allows for processors in a multiprocessor system to execute breakpoint code even when one processor has continued from the breakpoint.

Therefore, it would have been obvious to one of ordinary skill in the pertinent art at the time of the applicant's invention that applying Betker et al. to Pardo et al. would give Pardo et al. the benefit of being able to allow processors execute breakpoint code even when one processor has already continued from the breakpoint in a multiprocessor system.

42. As per claim 18:

Claim 18 recites the same limitations as claim 6 and is therefore rejected for the same reasons.

43. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pardo et al. (US Patent 5,754,839) as applied to claim 1 and in view of (Chrysos et al.: US Patent 6,163,840).

44. Pardo et al. teach claim 1 for the reason listed above.

45. As per claim 7:

Pardo et al. do not teach the method of claim 1, wherein the indicator is located in a field in the instruction, which Chrysos et al. do (Chrysos et al.: column 13, lines 36-42).

Chrysos et al. comment that the use of the S bit field in the instruction reduces the overhead of profiling by restricting the number of instructions that are profiled (Chrysos et al.: column 14, lines 20-22).

Therefore, it would have been obvious to one of ordinary skill in the pertinent art at the time of the applicant's invention that applying Chrysos et al. to Pardo et al. would reduce the overhead of profiling by reducing the number of instructions that are profiled.

46. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pardo et al. (US Patent 5,754,839) as applied to claim 1 above in view of Betker et al. (USPGPub 2003/0154463) and Legvold et al. (US Patent 5,404,500).

47. As per claim 10:

As was shown above in reference to claim 6, Pardo et al. has motivation to keep the indicators associated with instructions in an instruction cache based on the teachings of Betker et al.

However, Pardo et al. in combination with Betker et al. can not teach the method of claim 1, wherein the indicator is located in a shadow cache.

Legvold et al. teach a shadow cache (Legvold et al.: column 5, lines 56-58).

Legvold et al. comment that their shadow caches provide the advantage of backing up data on a cache failure that is an improvement on the prior art (Legvold et al.: column 3, lines 37-47).



Therefore, it would have been obvious to one of ordinary skill in the pertinent art to apply Legvold to Pardo et al. in combination with Betker et al. to provide back up of data in the instance that Betker's cache fails.

It is inherent that since Legvold's shadow cache mirrors the regular cache that Betker's indicators will be present in Leghold's shadow cache when applied to Pardo et al.

48. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pardo et al. (US Patent 5,754,839) in combination with Edwards et al. (US Patent 6,378,064) as applied to claim 12 in further view of (Chrysos et al.: US Patent 6,163,840).

49. Pardo et al. in combination with Edwards et al. teach the limitations of claim 12 for the reasons listed above.

50. As per claim 15:

Pardo et al. do not teach the method of claim 1, wherein the indicator is located in a field in the instruction which Chrysos et al. do (Chrysos et al.: column 13, lines 36-42).

Chrysos et al. comment that the use of the S bit field in the instruction reduces the overhead of profiling by restricting the number of instructions that are profiled (Chrysos et al.: column 14, lines 20-22).

When Pardo et al. is combined with Edwards et al. for watchpoints of data accesses, Chrysos' S bit field would provide the same advantages if it was applied to data addresses as well as instructions.

Therefore, it would have been obvious to one of ordinary skill in the pertinent art at the time of the applicant's invention that applying Chrysos et al. to Pardo et al. would reduce the overhead of profiling by reducing the number of instructions and data accesses that are profiled.

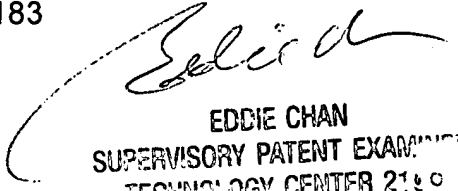
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan P. Fiegler whose telephone number is 571-272-5534. The examiner can normally be reached on M-F 12-8.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on 571-272-4162. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ryan P Fiegler  
Examiner  
Art Unit 2183

  
EDDIE CHAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2183